Boundary Commission and as that of the Alichur Pamir was by Dr. Paulsen during the second Danish Pamir Expedition, the last word on the vegetation of this region as a whole must be left unsaid. The numbers of plants found by Dr. Hedin in all the eastern valleys visited by him falls short of the number which Lt.-Col. Alcock has taught us may be found in a single western one.

The evidence supplied by Dr. Hedin, imperfect though it be, does, however, sustain the general conclusion, based on our acquaintance with the vegetation of the western Pamirs, that while many plants are common to all, some are peculiar to each.[3] Another general conclusion to which the material obtained by Dr. Hedin appears to point is that it may prove more convenient and natural to employ the term "High Asia," restricted by Dr. Hemsley to Tibet, in an extended sense which will include also the "Pamirs."

Tibet is by far the largest of the three regions visited by Dr. Hedin; he collected there twice as many plants as he found in the Pamirs, and three times as many as he gathered in East Turkestan. The plants from Tibet which the authors have been compelled to describe as new are five times as numerous as the new species reported from both of the other regions. The authors of this census are therefore fully justified in remarking that its main interest lies in the Tibetan plants therein discussed. These facts notwithstanding, it is more impossible to deduce conclusions regarding the vegetation of Tibet from the evidence here supplied than it is to do so in the case of East Turkestan or of the Pamirs. The phytogeographical indications are sometimes as inconsistent as in the case of East Turkestan and are, if possible, more inexplicable than they are as regards that region. Localities are at times placed in Inner Tibet with no indication of latitude or longitude, and therefore with only imperfect clues as to their precise situation. When more precise indications are supplied, Inner Tibet is now given as synonymous with Northern, anon as synonymous with Eastern Tibet. Certain localities are said in one case to be in North Tibet, in another to be in East Tibet. The list itself forms part of the sixth volume of a work entitled "Southern Tibet," yet it does not include any plant said to have been collected in South Tibet.

Perhaps the most interesting individual species in the list is one which Prof. Ostenfeld has proposed to treat as the type of a new genus, Hedinia. Though thus characterised, this plant, as it happens, is not a new discovery. It is one that so long ago as 1852 was referred by Dr. T. Thomson to the Cruciferous genus Hutchinsia, with the characters of which it conforms so indifferently that in 1861 it was transferred by Sir J. D. Hooker to the genus Capsella as admittedly a very aberrant member. In 1904 Mr. W. Lipsky was so impressed by the unsatisfactory character of both these suggestions that he transferred the plant to the genus Smelowskia. With this particular genus, however, the plant has less natural affinity than it has with either Capsella or Hutchinsia. The treatment now accorded the plant by Prof. Ostenfeld is certainly more convenient than any hitherto proposed. It is to be hoped that it may also prove to be more natural and that it may provide a lasting memorial to the explorer whose name it is intended to perpetuate.

Alcohol as a Fuel.

Power Alcohol: Its Production and Utilisation. By G. W. Monier-Williams. Pp. xii+323. (London: Henry Frowde and Hodder and Stoughton, 1922.) 21*s*. net.

THE enormous increase in the number of engines using motor spirit throughout the civilised world, and the demand for other products of mineral oil, have forcibly directed attention to the great problem of the world's reserves of oil, and to alternative sources of fuels suitable for engines where a fuel of high vapour pressure is necessary. Dr. Monier-Williams deals in his opening chapter with this big problem—the motor fuel question—in a very comprehensive and clear manner. It is shown that while in 1913 the import of petroleum spirit into the United Kingdom was 101 million gallons, by 1920 the imports had reached 200 million gallons. In the United States (where it is said that there is one motor car to every eight of the population) the motor spirit consumption rose from 1200 million gallons in 1914 to 2680 million gallons in 1918.

It is clear that this modern development of locomotion, together with the requirements for aviation, will make further and further demands upon Nature's not inexhaustible reserves of suitable fuel. Although much has been accomplished in rendering a greater proportion of the crude oil available as fuel, by widening the distillation range, by "cracking" heavier fractions, and by taking out the more easily condensible portions of natural gas ("casing head gasoline"), the world is undoubtedly faced with the big problem of Nature's reserves of oil and the possibility of alternative supplies of liquids of sufficiently high vapour pressure to supplement, or in the long run largely to replace, the motor spirit derived from crude petroleum. Dr. Monier-Williams says "a complete solution of the motor fuel problem can only be found in the opening up of extensive, and as yet unproved, new areas of supply, together with the introduction of fuels derived from other sources than petroleum."

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[3] NATURE, vol. cvii. p. 270 (April 28, 1921).

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Allowing the exclusion of a liquid fuel produced by inorganic agency, he considers that "contemporary vegetation constitutes the only alternative to bituminous mineral deposits as a source of motor spirit, and it would seem that it must eventually supply (as alcohol) a large proportion of the world's requirements." To-day it is a question of the comparative cost of alcohol and petroleum spirit, and alcohol is at a serious disadvantage. In concluding his first chapter Dr. Monier-Williams cogently observes that "the balance of evidence certainly favours the view that before many years have elapsed the supply of petrol will be permanently unequal to the demand, and that power alcohol, considered from the standpoint of a supplementary and not necessarily competitive fuel, has an undoubted future before it."

The many problems associated with the economic production of fuel alcohol have received a great deal of attention, and the author has given a most complete account of the chemical and economic questions involved. In his later chapters he gives very full information on the results which have been obtained in practice with alcohol, and fuel mixtures containing it, and particular mention should be made of the excellent chapter on the chemical and physical properties of alcohol from the motor fuel standpoint. Here are included the important results which have recently been obtained by Ricardo, Tizard and Pye, and Ormandy.

One of the outstanding problems in connexion with fuel alcohol must be the bearing of excise regulations on its production, and the associated question of denaturing. When duty-free denatured alcohol was legalised in 1855 the duty was only 12*s.* per bulk gallon; to-day it is 6*l.* 3*s.* 3*d.* per gallon of 95 per cent. alcohol. To protect the revenue many onerous conditions have to be applied to production, and these necessarily are reflected in the costs, but some relaxation has already been sanctioned since 1921. It is now possible to import power alcohol as bulk cargo at certain ports, denature it in bond with at least 25 per cent. of petrol, benzol, or other approved substance, and to distribute the spirit without further restriction for power purposes alone. Dr. Monier-Williams deals very fully with these questions of excise supervision and denaturation, but concludes, after summarising the ideal requirements of a denaturant, that no substance has yet been found which fulfils satisfactorily all these conditions.

Whether "Power Alcohol" is considered from the point of view of the chemist, the engineer, or the general reader, it gives a complete and well-balanced consideration to all the problems associated with the production and utilisation. Sooner or later alcohol seems bound to play no small part in our means of transport, but above all it is necessary to-day to maintain a proper sense of proportion, and this Dr. Monier-Williams may justly claim to have preserved. Enthusiastic advocates of a new development so often fail to recognise economic limitations.

J. S. S. B.

Chemistry and Life.

La Chimie et la Vie. By Georges Bohn and Dr. Anna Drzewina. (Bibliothèque de Philosophie scientifique.) Pp. 275. (Paris: Ernest Flammarion, 1920.) Price 7.50 frs. net.

BEYOND a short chapter with general statements concerning colloids, nucleoproteids and lipoids, and a chapter insisting upon the specificity of the chemistry of living animals and plants, chemistry plays no more part in the arguments of the authors of "La Chimie et la Vie" than many other sciences. The authors do not deal with pure chemistry, but with chemical physics—the object of which is to determine the influence exerted by physical conditions such as pressure, temperature and concentration of solutions on the progress or change of direction of chemical reactions. They object to the tendency to localise the various properties of plants and animals to particular chemical substances, and suggest that ferments, hormones, antibodies, etc., may not be specific substances so numerous and varied as the effects they produce; but they may be, on the contrary, various methods of activity of a limited number of substances resulting for the most part from the disintegration of living matter.

The main thesis of the book shows how insolubly bound up with one another are all the various branches of biological science. Discussion centres around recent work from practically every branch—chemistry, physical chemistry, zoology, botany, physiology, psychology, general biology, cytology, embryology, medicine, serology. The authors show how fruitful has been the introduction of chemistry to the study of phenomena of life and to what degree chemical physics has restored interest in and revived problems of biology. Some of their own work is recorded briefly. They describe how a double Hydra can be produced from a single Hydra by temporarily depriving the organism of oxygen, and how the symmetry of the Stauridium is altered by a simple change of environment.

The authors consider that the law of van't Hoff and Arrhenius may be applied to vital actions—development of the egg, reproduction, respiration, rhythm of the heart, and growth—and that the "law of reciprocal phenomena" holds for sleep, secretion, movement

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